

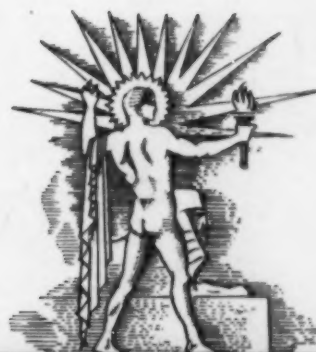
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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



NOVEMBER 2, 1935

Monotropa's Waxed Beauty

See Page 285

SCIENCE SERVICE PUBLICATION

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VOL. XXVIII



No. 760

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DO YOU KNOW?

The very beautiful snow leopards inhabit high mountain ranges of Asia.

Before the discovery of antitoxin, at least 45 per cent. of the cases of diphtheria ended in death.

The North Dakota Agricultural College finds that bees withstand winter cold successfully in beehives insulated with celotex.

A "frost machine," which creates any desired temperature around a corn plant, is used in government tests to produce more hardy strains of corn.

With the idea of increasing the yield of crude turpentine, German experimenters are applying hydrochloric acid on the fresh abrasion of the pine tree.

A British physician reports that patients recovering from head injuries, with disturbances of memory, usually regain memory of distant events before they can recollect recent happenings.

One cat out of 50 is a natural mouser, says a specialist in rodent control.

The fine new Palestine Archaeological Museum in Jerusalem has been completed, and exhibits are being installed.

Distinguishing goats from sheep is not always easy, for among the various forms there are some quite confusing to the inexperienced eye.

Although the American birth rate rose in 1934—the first increase in 10 years—the infant death rate also increased during that year.

Last year a cave in the Pyrenees Mountains yielded an amber horse's head, the first specimen of sculpture in amber by an artist of the Old Stone Age.

Nutritionists were puzzled to know where Mexicans got enough vitamin A in their food, but now they have figured it out: liberal use of chili pepper powder.

WITH THE SCIENCES THIS WEEK

Most articles are based on communications to Science Service or papers before meetings, but where published sources are used they are referred to in the article.

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PHYSIOLOGY-AVIATION

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PUBLIC HEALTH

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Why are measles and whooping-cough decreasing? p. 281.

SEISMOLOGY

Why is the Pacific Coast likely to have repeated earthquakes? p. 276.

EMBRYOLOGY

New Medical Nobelist Found "Leaders" Among the Cells

German Embryologist Discovered, At Early Beginnings Of Life, Cells That Show the Way to Differentiation

PROBING experimentally into the minute beginnings of life in its embryonic stages, a methodical German scientist discovered there cells that act as leaders, showing the way for the cells around them to develop into brain, spinal cord and other parts of the tiny structure that eventually grows into a man or woman.

Because of that discovery, Prof. Hans Spemann of Freiburg, Germany, has become the Nobel laureate in medicine for 1935.

American scientists learning of the award agreed that Prof. Spemann is one of the great world leaders in the particular branch of medicine known as experimental embryology. Although he is not the first scientist to study embryology by the experimental method, Prof. Spemann was one of the first to become dissatisfied with merely watching the embryo grow, in an effort to learn the secrets of how this tiny structure developed into a baby cat or dog or child. So he began experimenting with the growing embryo.

Among other experiments, he transplanted some of the leader cells into another fertilized egg, to see what would happen. In this way it was discovered that a spinal cord, for example, could be made to develop where one ordinarily would not have been found. The leader cells that stimulated development of the spinal cord continues to stimulate surrounding cells to develop into a spinal cord, even if the leaders are removed from their original location and placed elsewhere in the tiny embryo.

Various Names

These leader cells are known by various names, such as activators or inducers. At first they were thought to influence surrounding cells of the embryo by an abstract process called activation. Further research showed, however, that the effect is one of chemical stimulus. The same effect can be produced by the leader cells after they have been killed by heat as when they are alive and growing. The chemicals which make up the cells have this power to stimulate other cells, scientists have found.

Prof. Spemann is internationally known not only for his own discoveries but for the school of experimental embryology which he has built up in his laboratories. Among his followers in the path of science is one of his three sons, Dr. Fritz Spemann, who is teaching biology at Frankfurt-on-the-Main, Germany.

A daughter, Mrs. Margaret Cloos, is the wife of a scientist, Dr. Ernst Cloos, member of the geology faculty of Johns Hopkins University, Baltimore, Md. Mrs. Cloos is not a scientist, however, but occupies herself with the education of her two children.

Experimental research in embryology, which has attracted world-wide attention because of the Nobel Prize award to Prof. Hans Spemann, German leader in that field of science, is also being pursued in American laboratories. Among distinguished American investigators in this field are Dr. Ross G. Harrison of Yale University and Dr. George L. Streeter, director of the Carnegie Institution's department of embryology at Baltimore.

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ENGINEERING

Better Brakes Needed For Modern Motor Cars

UNDER the present conditions of road construction and braking ability present-day motor cars "should be considered decidedly unsafe" when driven at their top speeds, declared Prof. R. A. Moyer, highway engineer of Iowa State College, before the 24th Annual Safety Congress.

Safety, considering motor cars alone, said Prof. Moyer, lies in maintaining low stopping distances. To provide the same stopping distance when traveling at 60 miles an hour as at 40 miles an hour requires brakes two and one-half times as powerful.

"The manufacturers have not provided an increase in dependable braking power anywhere near that which these figures indicate should be provided, and until they do provide it the



PROF. HANS SPEMANN

present top speeds of cars should be considered decidedly unsafe," the highway expert concluded from the results of a four-year research study at Iowa State College.

Studies of speed distribution in large volumes of traffic indicate, Prof. Moyer added, that only ten per cent. of the traffic jeopardizes the safety; five per cent. consists of traffic moving slower than 35 miles an hour; and five per cent. the traffic moving faster than 55 miles an hour. Maintaining traffic speeds to about 45 miles an hour on open stretches of road would eliminate many of the hazards created by the present lack of a speed control plan.

Under present conditions of traffic it may prove far cheaper and possibly equally safe to use the airplane when speeds of more than 60 miles an hour are desired, Prof. Moyer indicated. Road tests show it costs twice as much to drive a car at 60 miles an hour than it does at 40 miles an hour. At speeds of 80 miles an hour the cost is probably four times as much as at 40 miles an hour.

Contrast in Records

The most recent demonstration of economy, Prof. Moyer pointed out, was the case of the new speed records on land and in the air. Sir Malcolm Campbell needed a 2,500 horsepower motor to average 300 miles an hour on the salt beds of Utah—probably the most perfect race course in the world. On the other hand Howard Hughes needed only a 1,000 horsepower motor to reach 350 miles an hour in the air.

Science News Letter, November 2, 1935

SEISMOLOGY

Helena Quake Caused by Mountains' Growing Pains

Scientific Shock Recorders Now Installed in Helena Federal Building to Record Tremors

GROWING pains of the comparatively young mountains around Helena, Mont., are responsible for the scores of earthquakes that have shaken and damaged the region in central Montana where the Missouri River begins to gather water.

Earthquakes are the price paid by the crust of the earth for its evolution and progress. And in that sense the Rocky Mountain region and the Pacific Coast, because they are younger geologically, are more progressive and likely to give man and his buildings jolts from time to time.

Scientists have put their scientific finger upon the spot where the major shock of Saturday, October 19, occurred. It is 70 miles north of Helena in the Little Belt Mountains, the range northeast of that city. Not particularly unusual are the scores of minor shocks that are reminding inhabitants unpleasantly of the big shake. More unusual was the previous Saturday's foreshock, the physical premonition of the major tremor to come, for earthquakes do not always "call their shots" in this way.

Scientific shock troops are on the scene of the disaster and have taken up a position in the basement of Helena's federal building. Rushing from California by fast motor truck, Franklin P. Ulrich, U. S. Coast and Geodetic Survey seismologist, brought two instruments and set them up to catch the dying tremors of the quake. Late on Monday night, October 21, an accelerograph and a vibration meter began writing their wavy records in order that the scientists may learn more about how the tremors occur. Passing through a snowstorm in the dash to Helena from the coast, Ulrich's truck had a minor skidding accident and U. S. Forest Service officials gave aid in getting the seismological instruments to Helena.

Many permanent seismographs miles away from Montana wrote with their pen and photographic fingers the story of the quake as telegraphed by vibrations of the earth itself. At Ottawa, Pasadena, St. Louis, Washington, Chicago, Tucson, Ukiah and elsewhere, as well

as at Bozeman, Mont., closest seismograph to the quake, scientists read the records, turned them into code and then telegraphed them to Science Service, where the information was relayed to the U. S. Coast and Geodetic Survey, Uncle Sam's agency for watching and reporting earthquakes. In this way the exact location of the center of the quake was more accurately determined in Washington than it could be in Montana. Its latitude was 47.1 degrees north, longitude, 111.8 degrees west. The exact time of origin was 11:48.1 p. m., Mountain Time, just a few minutes before Friday night passed into Saturday morning.

The fault or rock cleavage in the mountains that slipped and thus set up the vibration may not be found. The actual slippage of the rocks probably occurred deep in the earth and in this quake probably did not come to the surface of the ground as it sometimes does.

Montana's other important quake of recent years occurred in 1925 and was centered in the region of Lombard, south of Helena and nearer the head of the same valley. At that time geological investigations caused the issuance in government reports of warnings that other fractures in the mountains were probably carrying unrelieved strains that would probably cause future earthquakes.

Earliest record of an earthquake in the region was brought back by the famous Lewis and Clark expedition, one of the white man's first penetrations into Montana. One day in 1805, an earthquake was felt and sounds like distant artillery fire or thunder were heard. In 1883, the Gallatin valley region had strong shocks, but no damage was done because there were few inhabitants.

U. S. Coast and Geodetic Survey seismologists over the week-end sent 500 questionnaires to postmasters and leading citizens in a wide area around Helena, asking them to give the government the benefit of their earthquake experiences. This is expected to supplement the record of instruments. The government seismologists guess that

the shock of October 19 was not really as strong as the 1925 Montana quake, but that it was more localized. They rate it 8 or 9 on the earthquake intensity scale, with 10 a really bad quake.

Builders and architects of the region should take a lesson from the earthquake, seismologists warn. Buildings, for a very few dollars extra construction cost, can be made to withstand severe earthquakes. The difficulty has been in the past that few took earthquake risks seriously until the earth began to shake.

Science News Letter, November 2, 1935

PALEONTOLOGY

Wing-Bone of Pteranodon Found in Central Texas

FAR SOUTH of any previously known occurrence, the broken wing-bone of an ancient flying reptile has been found in Texas. It was sent to the U. S. National Museum in Washington by Tom H. Wells, of Austin, and identified as probably belonging to the genus *Pteranodon*, by Dr. C. W. Gilmore, Museum paleontologist. *Pteranodon* remains have not previously been reported south of western Kansas.

The discovery and identification of this hundred-million-year-old fragmentary fossil is reported in *Science* (Oct. 19.)

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IMPORTANT SHOT

Dr. Frank H. H. Roberts, Jr., points to the hand-made dart point of stone which he found fixed in the vertebra of an extinct kind of American bison. This means that human hunters must have been already in the New World when big game animals like this roved the wilderness.



TRENCHES OF PEACE

The deep trenches shown above were dug by Dr. Roberts in hope of crossing the path of America's ancient big game hunters. His digging retrieved numerous stone tools and other objects belonging to the mysterious strangers, but no human bones. The trenches lead to the cliffside in foreground, where the first campsite of the Folsom hunters was detected.

ARCHAEOLOGY

Finds Souvenir of Big Game Hunt, Ancient American Style

NO DOUBT about it—there were hunters roaming the American wilderness so long ago that they slew animals unknown today.

For the first time a hand-made stone dart point has been discovered where it dealt its death blow—fixed in the vertebra of an extinct form of bison. The find clinches in the affirmative arguments that man inhabited America in those early days, perhaps as much as 10,000 or 20,000 years ago.

The shot that paralyzed the hapless bison was discovered by Dr. Frank H. H. Roberts, Jr., of the Bureau of American Ethnology in Washington during recent excavations in northern Colorado. Dr. Roberts found the vertebra in an assortment of bison bones at a place where the ancient hunters butchered their game.

The bison were unearthed near a camp site of the "Folsom Hunters" as scientists name the early Americans whose association with ancient big game is being persistently studied. Dr. Rob-

erts spent the summer trenching in several directions around the place where last year he found traces of a primitive camp. Over 700 implements of the early Americans came to light this year, he reported, with discovery of new types. The variety of tools devised and used by these long-ago inhabitants is pronounced surprising.

First discovery of art work attempted by Folsom hunters is reported by Dr. Roberts. It is a flat disk of bone scratched with tick marks around the edge. What magic or decorative use the object had is unknown, but it reveals for the first time that Folsom man made his engraving tools—of which Dr. Roberts found many examples—for the sake of art.

The site, which continues to shed light on the life led by the earliest known Americans, was brought to the attention of the Bureau of American Ethnology by Prof. R. G. Coffin of Colorado Agricultural College.

Science News Letter, November 2, 1935

MEDICINE

Urges Scarlet Fever Control by Immunizing

A CHANGE in the standard methods of controlling or trying to control scarlet fever epidemics was urged by Dr. John P. Koehler, Commissioner of Health for Milwaukee, before the American Public Health Association. Dr. Koehler based his recommendations on experience during the epidemics of the disease in Milwaukee this year and last.

Testing school children by the Dick test, to discover those susceptible to the disease, and then making them immune to it by suitable doses of Dick scarlet fever toxin, is the most effective measure for controlling the disease, in Dr. Koehler's opinion.

Quarantine is less effective, he believes, because the disease is so largely spread by healthy carriers. It is almost impossible to quarantine these carriers, as they may carry the scarlet fever germs for many weeks after they have recovered from the disease.

"More money for immunization and less for contagious disease hospitals should be the slogan of all progressive health departments," Dr. Koehler said in emphasizing this point. "Scarlet fever quarantine is based more on tradition and expediency than on strict scientific facts," he added.

Strict isolation of all children under 7 years of age for six weeks during a scarlet fever epidemic not only reduces the number of scarlet fever cases but aids in the control of other childhood diseases, he told health officers. This measure was practiced with good results during the recent Milwaukee epidemics. Children under seven years are the most susceptible to contagious diseases and also the most exposed to them. They are the foci of most epidemics.

Safe and Effective

Dr. Koehler believes that children may be made immune to scarlet fever safely and effectively by the Dick procedure. While about half of those given this treatment suffer a reaction varying from local soreness to fever and illness for a brief period, this is no reason, in Dr. Koehler's opinion, for not giving the protective treatment. He pointed out that the physician or health officer who had previously won the parents' confidence would find that the parents do not object to the immunizations and do not worry about the reactions if they have been forewarned.

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EVOLUTION

Man May Disappear As Step Toward Higher Things

MAN'S future fate is either extermination or the oblivion of having been a stepping-stone for a higher sort of being in the evolution of the future, Sir James Jeans, noted English scientist, recently warned in a public lecture:

"Man's success has come to him only yesterday in the history of the earth," he said. "He had to fight wild beasts, and man has not always prevailed. He must still fight for his position on earth."

"If man fails in his fight, he may be

exterminated by smaller beings, perhaps by microbes.

"If he succeeds, his capacities may gradually be extended and increased until he develops into something entirely different and possibly superior to man of the present."

"Posterity ten million years hence may well differ as much from us as we do from our lowly ancestry of ten million years ago."

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PHILOLOGY

Place of A at Beginning Of Alphabet is Explained

IN LANDS of the Near East, a man does not start on a journey or begin work without calling God's name. And that, says Dr. George Lamsa, is why the alphabet begins with A.

A is for alep, ox. And in the days when some thoughtful person devised alphabet signs to represent sounds, the ox was worshipped as a god for its strength. It was proper, in the Near East, to begin the alphabet with a sign of deity.

Dr. Lamsa, Assyrian student of languages and Biblical subjects, has aroused interest by his new explanation of the alphabet's evolution.

Oriental psychology, he declares, played an important part in the alphabet's early form. But this has heretofore been overlooked.

The second letter, B, stood for house. But Dr. Lamsa points out that this was not merely chosen as a familiar object. It was a symbol of the family, or man. It properly came second to God. The third sign, which meant camel, stood for transportation. And so on through the early alphabet, there are certain meanings deeper than those ordinarily assigned to the picture-signs.

Dr. Lamsa compares the alphabet's evolution to that of the automobile: from a two-cylinder affair, to four, six, eight cylinders.

Writing started with signs. The crude signs in Near Eastern writing changed

to a wedge-shaped system called cuneiform writing. And then somewhere in the Near East, he believes, the great invention of an alphabet was made, so that a small set of signs might serve to express a whole language.

When and where the alphabet was invented is still debated in scientific circles, because of missing links in the evidence. Dr. Lamsa points out that the Near East is likely to remain a land of missing documents on this and other important historic matters. The reason is again Near Eastern psychology. When Assyrians and other Near Eastern peoples became Christian, or otherwise changed their religion, they swept out and destroyed the literature of their pagan past.

"Not many people realize," said Dr. Lamsa, "that this was, and still is, true. If I were to become a Mohammedan, I would have to burn my religious books. And any swine I possessed must be killed."

Race and religion are responsible for the changes that have taken place in the alphabet, since its introduction, he finds. As an example, Assyrians, Greeks, and others left the Nestorian Christian church in Persia, in 431 A.D. and as Jacobites they made changes in the characters of their alphabet.

This sort of difference survives in the Near East today, Dr. Lamsa points out. A man will say that he is a Jacobite or a

Nestorian. The other man may reply, "Write." And the form of writing he uses is his passport of identity, accepted by the stranger.

Dr. Lamsa is best known for his translation of the Four Gospels of the Bible from the Aramaic version. Aramaic, which was spoken by Jesus, is still the language of the land of the New Testament.

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PUBLIC HEALTH

New Way to Measure Extent of Mottled Enamel

DISCOLORED teeth with ugly brown spots that no amount of scrubbing with any kind of tooth paste or powder will polish to shiny whiteness, are the unfortunate lot of all the children in certain towns in the United States.

Just how much there is in the whole country of this disfiguring, incurable condition, known as mottled enamel, is unknown. A method for determining the extent of the disease, however, has now been developed by Dr. H. Trendley Dean and Elias Elvove of the U. S. Public Health Service. Dr. Dean described the method at the meeting of the American Public Health Association.

Mottled enamel is caused by fluorine in the water used for drinking and cooking during the period when the child's permanent teeth are being calcified. It cannot be cured, but it can be prevented by using water that does not contain harmful amounts of fluorine. As little as one part of fluorine in a million parts of water will probably cause the condition. Practically, prevention is a difficult matter, since it may involve changing the water supply of a community. In many of the communities where the disease is prevalent, especially in the Southwest, the fluorine-containing water is the only water available.

At present there are in this country alone more than 300 areas where the condition is prevalent. The areas are distributed among 23 states. There are no figures as to how many American children are afflicted with the condition, but the total number must be quite large, since as many as 90 per cent. are affected in some communities and 100 per cent. in others.

The quantitative method of determining the extent of the condition has now been applied in ten cities, Dr. Dean reported. These are Amarillo, Plainview, Lubbock and Big Spring, Texas; Colorado Springs and Pueblo, Colo.; Mon-

mouth and Galesburg, Ill.; and Conway and Mullins, S. C.

The method reported by Dr. Dean takes into account two factors. One is a common water supply which has not been changed in either its source or physical set-up during the life of the group of children examined. The other

is examination of a group of at least 25 children all nine years old or more who have used the water supply continuously since birth for both drinking and cooking. From these two factors may be determined the "mottled enamel index" of a community.

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PHYSICS

New Theory of Cosmic Rays Advanced by Dr. Swann

A NEW theory of the nature of cosmic radiation, rays constantly bombarding the earth and its inhabitants, is suggested by Dr. W. F. G. Swann, director of the Bartol Research Foundation of the Franklin Institute.

Dr. Swann's hypothesis, explaining cosmic rays as electrically charged particles, welds together some eleven known experimental findings which have puzzled scientists for years. His report appears in the *Physical Review* (Oct. 21).

Science Service has asked Dr. Swann's colleague, Dr. W. E. Danforth, to interpret the new hypothesis in simple language.

Dr. Danforth's statement follows:

Explanation of The Swann Theory of Cosmic Rays

By DR. W. E. DANFORTH, Bartol Research Foundation

ARE cosmic rays a sort of super X-ray, i. e. very high-powered "bullets of light," or are they particles or matter bearing electrical charges?

Until recent years the former possibility was almost universally favored. The recent journeys of scientists, bearing cosmic ray detectors to various parts of the world and to mountain tops, however, have proved that these projectiles, which pelt down upon us from interstellar space, are affected by the earth's magnetic field. Therefore they must consist, at least in part, of electrically charged particles such as electrons or protons.

A complete theory of cosmic rays, however, has a host of facts to explain. A theory must, for instance, result in a mathematical formula from which the number of cosmic rays at any altitude can be calculated. The appeal to physicists of the "super X-ray" or "photon" theory lay in its success in giving the

correct altitude formula. But now that a large part of the cosmic radiation is known to be of electrically charged nature, this success of the photon theory appears illusory.

A new form of charged particle theory, which enables one to explain all of the major known facts about cosmic rays, including the precise way in which their intensity varies with altitude, is propounded in the current issue of the *Physical Review* by Dr. W. F. G. Swann of the Bartol Research Foundation at Swarthmore, Pa.

Perhaps the boldest aspect of this theory is the supposition that the original (or "primary") rays continue right through our atmosphere in undiminished numbers until they bury themselves in the earth. But what, the reader may ask, about the fact that on a mountain top there are many times as many rays as at sea level? To this question Dr. Swann replies that nearly all of the rays which affect cosmic ray detectors are not the original primary cosmic rays, but are other electrically charged particles knocked out of atoms by the primary rays as the latter traverse the atmosphere. These secondary rays fly forward with practically the same direction as the primary which produces them. Some energy is lost by the primary every time it produces a secondary.

One of the cornerstones of the theory is the supposition that the number of secondaries produced in a given distance, is in direct proportion to the energy of the primary ray. Strangely enough, the theory permits a primary charged particle to be changed into something else, e. g. a bullet of light, once it is within the atmosphere.

Science News Letter, November 2, 1935

Whalers in the southern seas used to get 60 to 70 barrels of oil from a whale; now the industry manages to extract almost twice that much.

ARCHAEOLOGY

Finds of Cave Man Art Made in Interior Spain

NEW finds of the art of the Crô-Magnon cave men have been made in two caverns in the province of Guadalajara, Spain, by a father-and-daughter team of archaeologists, Juan Cabré and Maria de la Encarnacion Cabré. The style of the drawings identifies them as belonging to the Aurignacian period of Old Stone Age culture; they include as subjects plants as well as animals, and men or at least man-like figures—for the human representations are far less realistic than those of animals.

The man-like drawings are shown in both hunting and fishing scenes, and at least one of the figures is shown swimming.

Many of the animals represented are extinct, or at least are no longer found wild in Europe. These include bison, aurochs, rhinoceros, wild horse and wolf. Among animals still existing in the wild state are deer and goats, together with the representation of one bird.

As in many other cave-studios of Old Stone Age art, the walls were used several times over, so that now the outlines of several animals may be seen cutting through each other.

The figure of the rhinoceros is of especial interest. It is shown covered with wavy lines, which probably indicate that it was the extinct woolly species, adapted to the Ice Age climate.

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BY AN OLD SPANISH MASTER

Newly found cave drawings of the Old Stone Age. The animals represented in this sketch are deer, wild horse, wild cattle and (upper left) rhinoceros.

ETHNOLOGY

Ethiopians Do Not Wear Plugs in Their Lips

"HORROR" pictures circulating in this country to show Ethiopian slaves wearing long bones driven through their lips are misleading. So declares an ethnologist, Dr. J. P. Harrington of the Smithsonian Institution.

As a matter of scientific information, says Dr. Harrington:

1. Bones are indeed worn in the lip, upper, lower, or both, by some African tribes, in Anglo-Egyptian Sudan, for example, and Kenya. They are admired ornaments, no badge of servitude.

2. Neither Christians nor Mohammedans of Ethiopia follow this custom.

3. If there are people in Ethiopia, slaves or otherwise, wearing lip plugs, they are "foreigners" from parts of Africa where these ornaments are fashionable.

In Dr. Harrington's opinion, a photographer would have a hard time finding such subjects in Ethiopia.

Moreover, African lip plugs are not driven by force through the lip, as is reported, the ethnologist explains. Instead, the lip is perforated with a knife—never with the bone ornament—and plugs of increasing size are worn. In south Central Africa, so exaggerated is the style that both upper and lower lip may be stretched into a duck-bill, to hold big disks.

"Lip plugs are no more a badge of slavery than are the earrings worn in pierced ears by Europeans or Americans," says Dr. Harrington.

Science News Letter, November 2, 1935

AVIATION

Airplane Flight is Like Flying Fish, Not Birds

CREDIT for human flight has been given where it is not due, claims Dr. Carl L. Hubbs, of the University of Michigan, in a new Smithsonian Institution publication. Man does not fly like a bird, though he claims to (in Latin) when he speaks of "aviation." Man flies like a fish—a flying fish.

No bird flies on rigid wings, like a man-built, man-operated airplane, excepting only when it is gliding or soaring, Dr. Hubbs points out. Early attempts to imitate birds with flapping-winged flying-machines all ended in complete failure.

Flying-fish, however, always hold their long glider-fins rigid, and get their flight-energy by lashing the wa-

ter with their tails, which might be considered analogues of airplane propellers, except that they do not function in the air. They push the fish along the surface of the water, "taxi-ing" like an airplane about to take off, and when sufficient energy has been built up in this way, the fish "hops off" for a long glide through the air.

Watched from behind, a flying-fish is seen to hold its wide fins always steady, never flapping them at all. They move only when the fish wishes to change its course in the air, just as an airplane moves its ailerons for a bank or a turn.

Since flying-fish have no means for sustaining themselves in the air, their flights, or more properly glides, are relatively short. Dr. Hubbs has never observed one lasting more than twelve or thirteen seconds.

Science News Letter, November 2, 1935

HORTICULTURE

Drought Effects on Apple Trees Cured by Hypodermic

HYPODERMIC "shots" of boracic acid are recommended by Dominion horticulturists, for use in western Canadian orchards, particularly in British Columbia, to cure physiological diseases of apple trees that are "hang-overs" from the years of severe drought. The injections are given through holes bored into the tree trunks with an ordinary brace and bit.

Following the great drought, many apple trees in irrigated districts developed disease symptoms that made the fruit unmarketable and left the trees themselves in chronically sick condition. These ailments got the names of drought-spot, corky-core and die-back, the manifestations being misshapen fruit, brown cores and a sparse development of undersized leaves.

Injections of many kinds of chemicals were tried, but all were useless or even harmful except the boron compound. Following successful experiments with this treatment under the direction of Supt. R. C. Palmer of the experiment station at Summerland, B. C., recommendations for general use have been made.

It is emphasized, however, that just as the physician resorts to hypodermic needle only in emergency, so the boracic acid injections must be used only on trees that are really in a bad way. Good cultural methods and proper distribution of irrigation water are preventives which will make such emergency treatments unnecessary.

Science News Letter, November 2, 1935

IN SCIENCE

ARCHAEOLOGY

Tibetans Use Butter To Calk Their Boats

AN ANCIENT-type Tibetan buttered boat has been added to the exhibits of the Field Museum of Natural History. It consists of a frame of bent willow rods covered with hides; the seams were calked with butter, which the Tibetans use for a general-purpose grease as well as for food.

Although of modern date it is of very ancient pattern, resembling the Gaelic coracles of western Britain and the skin boats used centuries ago on the Tigris and Euphrates. It is practically circular in outline, so that any direction is forward. But in spite of its awkward shape it will carry surprising loads; the late Dr. Berthold Laufer used this identical craft on an expedition in Tibet, and found it would carry a couple of men and 200 pounds of goods.

Science News Letter, November 2, 1935

MEDICINE

U.S. Leads World in Birth Control Clinics

THE UNITED STATES has more birth control clinics in proportion to its population than any other country, Dr. Eric M. Matsner, medical director of the American Birth Control League has found in the course of a survey he has just completed. There are more than 225 such clinics under medical direction in the United States, an increase of 80 since last November.

Birth control clinics are not only more numerous but more effective in this country, Dr. Matsner reported at the fall meeting of the league's board of directors.

"Theoretically, Great Britain, the Scandinavian countries and the Soviet Union are in advance of America, since they regard birth control as a public health measure," he stated. "Practically, they are not in advance, since the methods available to birth control clinics there do not surpass and seldom equal in effectiveness those used in American clinics. In Russia the materials are of definitely inferior quality."

Science News Letter, November 2, 1935

THE FIELDS

PUBLIC HEALTH

Childhood Ills Decrease As U. S. Grows Older

MEASLES and whooping-cough, both serious diseases of childhood, are on the decrease, it appears from figures reported by Dr. Haven Emerson, of Columbia University, to the American Public Health Association.

The decrease has been particularly marked during the past five years, Dr. Emerson found. Deaths from both diseases and the number of cases of measles have been much fewer.

This is not because of any improvement in measures to control the diseases, Dr. Emerson indicated. Instead, the decrease appears to be the result of a change in the age distribution of the population. Fewer children and more adults in the United States within the past decade is reflected in the decline of these childhood diseases.

Science News Letter, November 2, 1935

PHYSIOLOGY—AVIATION

Twitching Fingers Danger Signals At High Altitude

WHEN a pilot flying at high altitudes notices his fingers beginning to twitch, it is time for him to seek the safety of lower levels, it appears from the experience of a U. S. Navy pilot.

The incident which showed twitching fingers to be a danger signal is reported by the Navy Department's Bureau of Aeronautics almost simultaneously with reports that flight surgeons of the War, Navy and Commerce Departments are planning tests which will show the effect of stratospheric conditions on flyers and passengers.

The incident occurred during an altitude flight by Fighting Squadron Six of the U. S. S. Saratoga.

"One of the oxygen regulators," states the Bureau of Aeronautics report, "began to economize a bit and the pilot became non compos mentis in such short order that he was unable to leave the formation voluntarily before becoming not only a hazard but a menace to the rest."

"As leader of the second section he calmly crawled up and tried to sit in the skipper's lap, then lost distance quite notice-

ably and finally ended up by flying around in a wide left circle, gradually losing altitude. His wing men saw his shoulders heave as he bravely pulled at the nipple to coax more oxygen into his starving lungs. After descending to 18,000 feet, he regained control of his senses and responded more or less intelligently to the signals of his left wing man, who finally coaxed him back into formation.

"After landing, he could not remember clearly what happened, but about a half hour later, while eating lunch, the memory started coming back. He then reported the following symptoms which may be of interest and value:

1. Slight twitching of the fingers.
2. Twitching of muscles in the wrists.
3. Difficulty in controlling the hands.
4. Eyesight apparently O.K. but range of vision very short.
5. Feeling of annoyance when squadron commander made a turn.
6. No apparent discomfort or loss of breath.
7. No knowledge that anything was wrong.
8. No sense of hearing (had radio but did not respond to repeated calls)."

Science News Letter, November 2, 1935

MEDICINE

TB Cases in Rural Areas Come from Outside Contacts

IN RURAL areas more new cases of tuberculosis develop from contacts with tuberculous persons in schools, factories or other work places than from contacts within the home and family, it appears from a report by Jean Downes to the American Public Health Association.

Miss Downes, working under the Milbank Memorial Fund, investigated the spread of tuberculosis in Cataugus County, N. Y. She found that in this region for every case resulting from a family contact there were two in the community as a result of contact outside the family.

"Tuberculosis in that rural area has been acquired chiefly through contact in the small centers of life, the family, the factories and other work centers, and the schools," Miss Downes reported.

"The individual living in the tuberculous family has a definitely higher personal risk of contracting the disease than other individuals in the community, but the spread of serious disease from the tuberculous family into the community at large is probably as great as the spread within the family."

Science News Letter, November 2, 1935

MEDICINE

Describes Operation For One Type of Epilepsy

AN OPERATION, in which part of the brain is removed, relieved the symptoms, apparently permanently, in nine cases of one type of epilepsy, Dr. Ernest Sachs of St. Louis reported to the Second International Neurological Congress.

The condition for which the operation was used is known medically as Jacksonian epilepsy. Because sufferers from this ailment may go for a number of years without having convulsions, Dr. Sachs hesitated to say that his patients were "cured." They have been free of all symptoms for a number of years, however. One of them has been well for eleven years and for the past five or six has been able to carry on his work as professor of physiology in a medical school.

In operating on these patients, Dr. Sachs removed an entire convolution of the brain, using a special technic devised by Sir Victor Horsley of London. In this operation the pia, which is the innermost membrane of the three that cover the entire brain, is detached and laid back first, and then the single convolution, which is the seat of the disturbance that causes the convulsions, is removed without encroaching upon a neighboring area.

Science News Letter, November 2, 1935

MEDICINE

International Serum Center is Established

THE ROYAL Danish Serum Institute at Copenhagen will become a sort of international clearing house for serums used in treating or preventing disease, as a result of action taken by the eleventh Congress of Biological Standardization held in connection with the League of Nations Hygiene Congress.

The Danish Institute has been appointed the international center for preparation and standardization of serum for such diseases as dysentery, lockjaw, diphtheria, pneumonia and wound fever.

London will similarly become the international center for vitamins, insulin and the sex hormones.

International standards for the preparation and composition of twenty-five of the medicaments to be distributed from Copenhagen and London have been agreed on by the Congress.

Science News Letter, November 2, 1935

ASTRONOMY

Overhead Is Andromeda Nebula

**Nearest Island Universe, 900,000 Light Years Away,
Only One Visible to Naked Eye; Meteors Due on the 15th**

By JAMES STOKLEY

THE CONSTELLATION of Andromeda, now directly overhead in the evening, can be recognized from the two streams of stars which extend to the northeast from Alpheratz, the star in the corner of the Square of Pegasus. In the row of fainter stars, the one nearer Cassiopeia, there is a faint patch of light which can be seen upon a dark clear night, that is the most distant object that can be seen with the naked eye. The sun is about 93 million miles from earth, the nearest stars are a million times as far, the luminous spot in Andromeda is a hundred thousand times as far as that.

Naturally such a large figure, expressed in miles, would be rather awkward to handle, and so the astronomer uses another unit. This is based on the speed of light, which travels eleven million miles a minute. The radiation of the sun takes about eight minutes to come to the earth; that of Sirius, the nearest bright star seen from northern latitudes, takes about as many years; so the astronomer says that its distance is eight light years. One light year is about six million million miles. Sirius, therefore, is about 48,000,000,000,000 miles from us.

Recent Discovery

Until about a decade ago the tremendous distance of the Andromeda object was unknown. During the 1890's, Isaac Roberts, an English astronomer, had shown by his photographs that it had a spiral structure, similar to other spiral "nebulae" which had been observed previously. Long before that Sir William Herschel had shown that the sun and all the stars that we can see in the sky, and most of the other objects as well, are part of a great grindstone-shaped system—the Galaxy. As we look out toward the edge of the grindstone, we see a great concentration of stars. This is the Milky Way. Toward the side we see the stars more sparsely distributed.

Until 1924 there were two ideas regarding the Andromeda "nebula" and the other spirals. One was that they were also part of our own galactic sys-

tem, though their distribution was a point against it. They are most numerous in the parts of the sky where the stars are scarcest. The other theory was that they were "island universes"—other galaxies, similar to our own, but outside its limits.

In 1924 the answer to the puzzle was found by an astronomer at the Mt. Wilson Observatory, Dr. Edwin P. Hubble. With photographs taken through the hundred-inch reflector, the world's largest telescope, he recorded for the first time the individual stars in the Andromeda spiral and in one other.

Many Thousands

Just as the Milky Way appears to the unaided eye as a continuous patch of light, while even opera glasses show the stars of which it is made; so smaller telescopes had previously failed to reveal those in these "nebulae." Some of the stars which Dr. Hubble found were such that he could determine their distance. This proved to be about 900,000 light years, for the Andromeda object, and a little farther for the other. So it was finally shown that there are other systems outside our own.

As the world "nebula" really means a cloud, like the one of glowing gas in the constellation of Orion, astronomers have now stopped applying it to these ob-

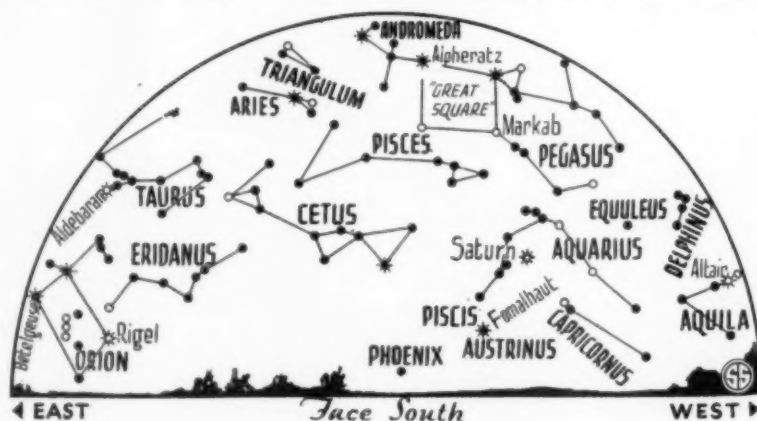
jects and they are called "galaxies." The one in Andromeda is the nearest, and the only one that can be seen with the naked eye. Many thousands have been observed, extending out as far as the hundred-inch telescope can reach.

Until the past year or two, however, there seemed to be an important difference in size between our own galaxy and the others. Some authorities thought the diameter of ours to be 200,000 light years, while the one in Andromeda was estimated to be as small as 30,000 light years. About 1930 Dr. R. J. Trumpler, of the Lick Observatory, and Dr. Piet Van de Kamp, of the McCormick Observatory, both found incontrovertible evidence of absorbing material in our Milky Way. Space between the stars is not perfectly transparent, as we used to think, but is permeated with a sort of fog. Not knowing this, astronomers had previously thought that the difference in brightness between most of the stars was due mainly to the greater distance of the fainter ones. With the light of even a bright star absorbed on the way, it would appear at a greater distance than it really is. These researches brought the size of our galaxy down to about a hundred thousand light years or less—the exact size is still somewhat uncertain.

Electric Eye

Even this left the Andromeda galaxy much smaller than ours, until Dr. Joel Stebbins, working at Mt. Wilson with the photoelectric cell—the "electric eye"

◊ * ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS



WINTER STARS

In the east these evenings are the first of the glorious winter stars—in the constellations Auriga, Taurus, Orion, and Gemini.



NEAREST ISLAND UNIVERSE

High overhead may be seen great Andromeda nebula, only one visible to the naked eye.

—attached to the hundred-inch telescope, showed it to be about twice as large as formerly supposed. Extending beyond the limits of this galaxy shown on the photographs there are many more stars, which were detected by the electric eye. So now the sizes of the two galaxies are believed to be about the same. Probably others are of similar size, and one of the reasons that makes astronomers await eagerly the completion of the two-hundred-inch telescope of the California Institute of Technology is that they hope this great instrument will reveal further facts about these important objects.

On the night of November 15, and the early morning hours of the 16th, astronomers expect to see some of the Leonid meteors that come every year, but they hope that the display will not be as disappointing as it was in 1933 and 1934. In 1799, 1833 and 1866, November brought famous showers of these meteors, or shooting stars. They seem to radiate from the constellation of Leo, the lion, which rises in the early morning hours, hence their name. Actually the meteors, most of which are no larger than the head of a pin, are moving around the sun in parallel paths. When the earth crosses their orbit in November of each year, we encounter some of them, and their paths seem to converge in the distance in the direction from whence they came, which happens to be toward Leo. As they enter the atmosphere, they are burned by the friction, and disappear in a flash of light.

The Great Showers

Though there are some meteors all around the path, at one place they are more concentrated. In the years of the great showers, the earth encountered this swarm. It missed us in 1899 and 1900, when it was thought another great show-

er might have been seen, and again in the last two years. But there may be a few more than usual this year, and astronomers who are particularly interested in meteors will watch the sky on the night of the 15th, as well as those before and afterwards, in case the display is early or late.

Amateur observations of shooting stars are always welcomed. The easiest one to make is simply a count of those seen during half-hour periods; for instance, from midnight to 12:30, 12:30 to 1:00 a. m., and so on. More meteors are seen after midnight, because then we are on the advancing side of the earth and meet them head-on, whereas before midnight they must catch up to us. On ordinary nights it is usually possible for one person to see them at the rate of one or two an hour, but on the nights of the showers, they may come as fast as one a minute. On nights of the great showers hundreds could be seen at once.

Dr. Charles P. Olivier, director of the University of Pennsylvania's Flower Observatory at Upper Darby, Pa., is one of the leading authorities on meteors. Amateur observations should be sent to him.

Bright Saturn

Only one of the naked-eye planets appears in the evening skies this month at the times for which these maps are prepared (10 p. m. Nov. 1; 9 p. m. Nov. 15; 8 p. m. Nov. 30), though red Mars, rather faint, can be seen low in the southwest just after darkness has descended. Saturn, however, appears in the south, with a steady glow, as brilliant as a first magnitude star. But even without the brilliant display of planets that we enjoyed earlier this year, the November evening skies are interesting, for now begin to appear the first of the glo-

rious winter constellations—Auriga, Taurus, Orion and Gemini.

An excellent way of starting to find the stars now visible is from the four high in the south that form the "Great Square in Pegasus." When you find it, you have located two prominent star groups, the star in the upper left corner is Alpheratz. Together with two rows of fainter stars extending over to the northeast, this forms the figure of Andromeda, represented in mythology as the princess who was chained to the rock. The other three stars in the square, as well as those near the westernmost corners, outline the winged horse, Pegasus.

Southwest of Pegasus, easily identified because of the presence in it of Saturn, is Aquarius, the water-bearer. Still lower, and farther south, is Fomalhaut, in Piscis Austrinus, the southern fish.

This is not the only heavenly fish on view this month, for two others, the constellation Pisces, can be seen below and to the left of the Great Square. Sprawling his great length across the southeastern sky, below this group, is Cetus, the whale. Still another watery constellation, though not as conspicuous, is Eridanus, the river, below Cetus.

The Bull's Eye

Toward the east is Taurus, the bull. Red Aldebaran marks his eye; a V-shaped group of stars of which he is part, with the point to the south, outlines the face. Over them are the Pleiades, the famous "seven sisters," a little cluster of stars in the animal's shoulder. Only six of the sisters ordinarily appear to the unaided eye, though one particularly keen, or aided with opera glasses, can see many more. A little higher than Taurus, farther north, is Auriga, the charioteer, with the first magnitude Capella, and below this group are the twins, Gemini, with Castor above and Pollux below. Below Taurus is Orion, the warrior, who can easily be found because of the three stars in a vertical row that mark his belt. Later in the evening these are followed by Procyon, in Canis Minor, the lesser dog, and still later by Sirius, the dog-star, brightest in the sky, in the southeast.

To the west can be viewed the northern cross, or Cygnus, the swan, with Deneb at the top of the cross, now in a vertical position. Below, to the north, is Vega, marking Lyra, the lyre, while Altair can be seen farther south, in Aquila, the eagle. Low in the northern sky is the Great Dipper, part of Ursa Major, the great bear. Above it is the Little Dipper, with Polaris, the pole

star, at the end of the handle. Almost overhead in the north is the W-shaped group Cassiopeia, close to her daughter, Andromeda.

During the month the moon is at first quarter on the third, full on the tenth, at last quarter on the 17th and new on the 25th, so that the first ten days or so will have moonlit evenings. On the eighth it will be at "perigee," or nearest the earth, only 225,500 miles away. "Apogee," when it is most distant, will come on the 20th, with 251,550 miles separating us.

Science News Letter, November 2, 1935

CHEMISTRY

Butter Analysis Method Makes Dirt Detection Easy

DIRTY butter is less likely to find its way to American tables in future, thanks to a new analysis method devised by W. S. Greene, microanalyst of the Food and Drug Administration, U. S. Department of Agriculture.

Although most creameries are kept clean as hospitals, an occasional careless or slipshod handling plant will expose butter, or the cream from which it is made to contaminants. And once in, they are impossible to detect by ordinary means; only everlasting vigilance by handlers and inspectors can keep butter dependably clean.

In food inspection laboratories, the method is basically to get rid of all the butter, leaving only the tiny dabs of contaminating substance on a sheet of filter paper. The difficulty of preparing for such inspections in the past has been due to the presence in butter of a certain small percentage of casein, the principal food-substance in cheese, which coated over the dirt particles and made them almost impossible to get out and examine. Chemical treatments efficient in dissolving away this casein coating also dissolved contaminants.

Mr. Greene's contribution consists in the discovery that a simple solution of borax will do the trick. A sample of butter is heated to a boil with a quantity of the borax solution, and the mixture passed through a paper filter under suction. This filter paper is then rinsed with gasoline, to remove any residual grease. This leaves the filter paper entirely clean if the butter is entirely uncontaminated; if there is any dirt in it, it stands out on the white surface and can be picked off for microscopic examination and identification.

Mr. Greene's new method is described in detail in the trade journal *Food Industries*. (Sept. 25).

Science News Letter, November 2, 1935

ARCHAEOLOGY

Announces Altar Find Solving Great Monte Alban Mystery

THE MYSTERY of Monte Alban, buried city in southern Mexico where spectacular treasure was found in 1932, has cracked.

No longer an orphan among cities of ancient America, Monte Alban proves to have a close relative in both Toltec and Mayan Indian civilizations of prehistoric Mexico. Evidence thus clearing up the identity of the long-abandoned city was reported in Washington, D. C. by Dr. Alfonso Caso, Mexican archaeologist. Dr. Caso announced his discoveries before the Pan American Institute of Geography and History, which assembled in Washington a notable group of scientists from American countries.

Dr. Caso found his evidence when he dug under an old altar site in a secret sunken court in Monte Alban ruins. He was following a hunch that the people of this city might have followed Mayan Indian custom of putting things precious to them under altars. The hunch worked and with unexpectedly rich results. He unearthed exquisite male and female figurines of jade, and other sacred green stones carved in style he

recognized perfectly as like that of Toltec Indians. There were bone fragments of an eagle and a tiger buried there, also. As these animals symbolized the sun as a god in ancient Mexico, they perhaps tell in whose honor the altar was set up. Mayan custom of altar cornerstone-like deposits, and Toltec art ideas showed Dr. Caso where the ancients of Monte Alban had their cultural alliances.

Under this rich deposit, proved very old by its link with Toltec Indian civilization, he unearthed cruder pottery offerings from an even earlier time in prehistory.

A big, stone-lined underground passage, discovered under the altar site, is now identified as part of a great sewer system by which the Indians drained the massive earthwork of the city's North Platform. The tunnel, which was five feet high and peak-roofed, ran diagonally under the sunken patio where the altar was. When first detected, the tunnel mystified the archaeologists, who wondered what its purpose could have been.

Science News Letter, November 2, 1935

MEDICINE

High Fever Kills Cancer Cells But is Not a Cure

TWENTY minutes' exposure to a temperature of 111.4 degrees Fahrenheit will destroy all the malignant tissues in the body of a rat that has cancer, Dr. George Walker, of Baltimore, has found. Unfortunately, however, the discovery does not provide a method of curing the cancer, since the rat is unable to survive this high temperature, Dr. Walker reports. (*American Journal of Cancer*, October)

The results of the research might be expressed in the old phrase, "The treatment was successful but the patient died."

But the work has further significance. For one thing, Dr. Walker's research brings out the fact that some methods of inducing artificial fever may be safer

than others. In these days when fever is being induced deliberately to treat disease, notably to treat the mental disease resulting from syphilitic infection, this finding of Dr. Walker appears to be of importance.

The artificial fever produced by high frequency apparatus, in which the temperature of the body is elevated by passing short radio waves through it, appears more dangerous than the artificial fever produced by the thermostat, Dr. Walker reported. In his work with the rats he used both methods.

Discovery of the effect of high temperatures on cancer cells was made in the course of test-tube experiments with a certain type of breast cancer from which Dr. Walker's colony of rats suf-

ferred. Bits of cancer in a test tube were destroyed when heated to 111.4 degrees Fahrenheit, Dr. Walker found. When he tried raising the temperature of the cancerous animals to the same high point, the tumors were destroyed but the animals were unable to live more than a few hours after the treatment.

When this method failed as a cure for the cancer, Dr. Walker tried raising the temperature of the cancerous rats to the highest point at which they could live. This was 109 degrees Fahrenheit. While thirty minutes of this high temperature did not injure the animals, it had no effect on the cancer and the animals finally died of the disease.

Science News Letter, November 2, 1935

FORESTRY

More Forest Fires But Smaller Area Was Burned

FOREST fires, raging in the Los Angeles region and menacing elsewhere, might have been far worse this fall if the woods had not been full of C.C.C. workers. Latest figures available at the U. S. Forest Service show that forest fires this fall in National Forests, over the country as a whole, have numbered 9,512, as against a preceding five-year average of 7,601—an increase of about twelve per cent. But the total area burned this year has been only 192,040 acres, as against a five-year average of 417,603 acres—a decrease of well over one-half.

Forest Service officials give full credit to the C.C.C. workers for this creditable showing in reduction of loss. In the first place, armies of fire-fighters stand "at the ready" all the time, so that counter-attack against the flames is much more prompt than it used to be. But more basic and permanent has been the work of the C.C.C. in building fire roads, clearing fire breaks, cleaning up accumulations of slash, snags and other forest-fire bait.

A factor in the increase of forest fires, at least in numbers, is the continually growing army of people entering the National Forests, especially recreation-seekers. The number of man-caused fires in the National Forests this season was 5,506 as compared with the five-year average of 4,359 for the 1931-34 period.

Taken by regions, the Forest Service summary of the situation is: Southern California, hazardous; Northeast Atlantic states, medium hazardous; parts of the South, medium to highly hazardous; elsewhere, generally favorable.

Science News Letter, November 2, 1935



Athena's Companions

OWLS are the subject of folklore and even of religious awe in all places, and have been so at all times; from the cultured Greeks who honored Athena to the Aztec subjects of Montezuma, down to our own owlsh pranks of Hallowe'en time.

In most mythologies, the owl has been the companion of the gods of night or death. Naturally enough, too; most owls fly by night, are preternaturally silent except when they choose to give vent to blood-chilling hoots and quavers, and all of them are birds of prey, who can live only if they kill. Our own association of owls with witches goes back to the old priesthoods of forgotten gods of gloomy North European forests.

Perhaps the most famous of all the owl-favoring deities was Athena, or Minerva as the Latins called her. She was anything but a gloomy goddess, and has for ages been the very pattern of the calm, highly intelligent woman who deliberately chooses spinsterhood that she may be the more free to pursue a career of good works. Yet Athena always had an owl about the premises.

More than that: in the earliest days of her career, long before there was an Athens, Athena apparently *was* an owl herself; or at least a woman with an owl's head. In the ruins of Troy, when they were excavated by the famous German archaeologist Schliemann fifty years ago, there were found no end of vases, urns, and other objects of metal and pottery, in which an owl's head on a woman's body were represented.

It seems to have been a case of one of those deities, common enough in the East, in which admired superior qualities in an animal were linked with a super-human mentality, and a sculptor's effort made to symbolize in a visible, tangible way the combined concept.

But the Greeks, who arose as a culture-group long after their predecessors the Achaeans had destroyed Troy, had no taste for such "therocephalic" gods. They plucked the composite proto-Athena apart, made a superb woman out of the queer Asiatic hybrid, and transformed the grotesque owl-mask into a decently respectable normal bird on her shoulder or at her feet.

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BOTANY

Monotropa's Waxed Beauty Feeds on Damp Decay

See Front Cover

INDIAN Pipe, or Monotropa, a flowering plant that feeds saprophytically like a mushroom on dead and decaying plant remains, is a frequent find in moist autumn woods. The clump pictured on the cover of this issue of the SCIENCE NEWS LETTER is described by the photographer, Miss Mary L. Didlake of the Kentucky Agricultural Experiment Station, as "the largest clump I have ever seen, at least 75 separate stems. They were pink, lovely and translucent, only the tips of the bells being white."

Science News Letter, November 2, 1935

GEOGRAPHY

Threatened

● "The night of April 9, at half-past one, we were awakened by severe shocks. We dressed rapidly, and the whole camp was on its feet in a few minutes. At the spot where the day before the cookhouse had stood there was now a gigantic ridge of packed floes. This was moving with a great clatter and thunder, and steadily advancing on the tents. The whole camp was threatened with destruction. The ice-field on which the barrack-hut stood was crushing down on the floe which sheltered the remainder of the camp.

"We left one on duty at each tent ready for emergency evacuation, and the rest of us set to work. We had to help the barrack-hut dwellers, who were on the other side of the creaking and crashing barrier. The barrier was menacing the tents, threatening to crash down on them. The uninhabitable part of the barrack-hut, which had been torn away, was already buried beneath masses of rearing ice. Cases of matches, of which we had ample, fell between the crushing floes, and were ground up and flared up like torches."—Yakov Yakovlevitch Hakkel in *THE VOYAGE OF THE CHELYUSKIN* by Members of the Expedition (Macmillan).

Science News Letter, November 2, 1935

ENGINEERING

Magnetic Alloy Promises Better Radio Loudspeakers

Method of Removing Ice From Airplane Propellers Among Engineering Achievements Viewed on Tour

EDITOR'S NOTE: Robert Potter of the Science Service staff accompanied the business executives on this interesting research tour of American industries. Further accounts of the trip will appear in next week's Science News Letter.

A NEW magnetic alloy, whose permanent magnetism is so powerful that it will lift sixty times its own weight, was shown at the laboratories of the General Electric Company, on the first stop of the Tour of Industries sponsored by the engineering division of the National Research Council.

The purpose of the tour was to emphasize the importance of scientific research for industry, not only in developing new products and better ways of making old ones, but also to replace testimonials and high-pressure selling, in the court of consumer acceptance, with scientific truth and tested realities, declared Maurice Holland, who organized the tour.

The new magnetic alloy is made of aluminum, cobalt, nickel and iron, and will have important applications in the radio industry for the construction of high-quality radio loud-speakers at low cost.

Present dynamic loudspeakers, said W. E. Ruder of the research laboratory, require strong magnetic fields obtained by use of electromagnets. The new permanent magnetic alloy will replace these more costly electromagnets.

The new alloy provides illustration of the unforeseen developments possible through scientific research. Mr. Ruder pointed out. It was not originally developed for its magnetic qualities, but as a heat-resisting alloy which would not deteriorate at high temperatures.

In Japan, on the other side of the world, Prof. T. Mishima of Imperial University, Tokyo, discovered the magnetic properties of a somewhat similar alloy. When the Japanese research was made known, the American laboratory needed only the development of a heat-treating process which would bring out the full magnetic properties of the alloy, Mr. Ruder said.

Carrying Power

What may well be the scientific salvation of the federal government's scheme

of widely-scattered power-generating plants at such places as Grand Coulee Dam on the Columbia River, Norris Dam in the Tennessee Valley and Maine's Passamaquoddy project, was described at the laboratories. It is power transmission by direct instead of alternating current.

In the forefront of criticism over the Administration's efforts to put the nation in the electric power business has been the hard-to-answer question of how the enormous amount of power to be created will be used.

With cross-country transmission of electric power by alternating current methods limited to about 300 miles, one suggested solution for isolated projects has been to establish industry on Maine's rockbound coast and the Columbia River—to choose only two examples.

Investigation of the possibilities of direct current power transmission over unlimited distances cross-country at the General Electric laboratories suggests the alternative solution—to bring the power to established industrial centers.

Newly developed direct current power transmission involves no changes in either the generating or distributing systems which both work on alternating current.

Convert Where Needed

The secret of success of the plan is to convert easily and cheaply from direct to alternating current where the electricity is needed, and particularly to make the direct-current form carry the power over the long-distance cross-country jumps.

Conversion from one to the other type of electric current is accomplished by using potentials up to 30,000 volts and 6,000 kilowatts power capacity, obtained with various types of specially designed metal vacuum tubes.

Some tubes, operating as "valves," change alternating to direct current; others convert the current in the reverse sense. Such tubes, standing more than a yard in height, are in principle akin to

the tubes used in home radio receivers.

The cost of vacuum-tube converting systems is now near the price level where installation on a power line more than fifty miles long is as cheap as are the huge transformer systems needed with the alternating current systems.

As oil aids sailors by quelling tossing seas, so may oil be the newest help for aviators in their battle with the menace of ice formation on airplane propellers.

Scientists at the B. F. Goodrich Rubber Company described to tour members the newest tricks in de-icing airplane wings and propellers with the aid of studies in the refrigerated wind tunnel in their laboratories.

Ice forming on the propeller is a hazard in commercial and military aviation not so much because of the added weight of the ice but because the propeller may become unbalanced by unequal weights on the propeller blades. Moreover, a coating of ice can change the contour of the propeller and decrease its efficiency.

De-icing propellers, said Harry E. Waner, Goodrich engineer, involves the covering of the propeller hub with a spinner cap which is covered with rubber and then treated with a special oil preparation.

"The propeller blades," he added, "are also covered with rubber on the thrust side, around the entering edge and back to approximately the line of the thickest section on the convex side."

"This treatment, it must be understood, is not designed to prevent the formation of ice. Its purpose is, however, to minimize adhesion and thus allow centrifugal force to throw off the ice in smaller quantities, instead of large chunks. This, it will be seen, will prevent the off-balancing of propellers."

Work is at present under way, Mr. Waner indicated, on the use of a continuous flow of oil over the rubber propeller surfaces instead of the single oil treatment now in use.

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● RADIO

Tuesday, November 5, 4:30 p. m., E.S.T.
AMATEUR ASTRONOMY, by James
Stokley, The Franklin Museum, Philadelphia.

Tuesday, November 12, 4:30 p. m., E.S.T.
HAZARD IN HOUSEHOLD HEATING,
by Dr. Wilmer H. Schulze, City of Baltimore Health Department.

In the Science Service series of radio addresses given by eminent scientists over the Columbia Broadcasting System.

•First Glances at New Books

Additional Reviews
On Page 288

Psychiatry

CHILD PSYCHIATRY—Leo Kanner—*Charles C. Thomas*, 525 p., \$6. This is the first text on child psychiatry in the English language, and a very comprehensive, clearly written and sane text it seems to be. It is based on a careful study of large numbers of actual children in the wards and outpatient department of the Harriet Lane Home, Johns Hopkins Hospital. The book should be very useful to pediatricians and physicians in general, and to psychiatrists, social workers and educators as well. While not too technical for the intelligent lay reader, the author would doubtless agree that parents should not use it as a guide, but should seek the advice of a trained child psychiatrist rather than try to handle their children by their own interpretation of this text.

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Geography

ECONOMIC GEOGRAPHY OF ASIA—Daniel R. Bergsma — Prentice-Hall, 618 p., \$5. A comprehensive and exhaustive treatment of the economic geography of Asia and the principal adjacent island groups, which will be useful not only in university classes but also for reference and general reading by any one who wishes to keep informed on factors important in the world's present turmoil of transition.

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Entomology

THE ABDOMINAL MECHANISMS OF A GRASSHOPPER — R. E. Snodgrass — *Smithsonian Institution*, 89 p., 45c. Although a far worse enemy of the farmer than wolf or wildcat, the grasshopper has remained relatively ill known in its detailed anatomy. Mr. Snodgrass' classic studies are ending this anomaly, to the advantage of both economic and "pure" entomology, and of biological science generally.

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Sociology

FAMILY AND SOCIETY; A STUDY OF THE SOCIOLOGY OF RECONSTRUCTION—Carle C. Zimmerman and Merle E. Frampton — *Van Nostrand*, 611 p., \$3.50. What will be the pattern and destiny of American family life? To consideration of this important question the authors have brought a book load of evidence, from simple and remote societies and also from complex civilizations. The authors favor application of theories sim-

ilar to those held by Frédéric Le Play. A considerable section of the book consists of an abridged translation of Volume One of Le Play's "Les ouvriers européens," making the Frenchman's work thus available for the first time in English.

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Geography

THE HAWAIIAN ISLANDS—Otis W. Freeman—*McKnight & McKnight*, 68 p., 24c. Brief but informative, compactly written, with a number of clean-cut outline maps and halftone illustrations.

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Archaeology

EVIDENCE OF EARLY MAN IN NORTH AMERICA—Edgar B. Howard—*University of Pennsylvania Museum*, 176 p., 26 pl., \$1.50. Ten thousand years is found by this archaeologist to be the most satisfactory date for the length of time man has been in America. In arriving at this estimate, Mr. Howard reviews his own very significant discoveries, as well as the findings of many other Americanists. A seven-page bibliography is provided.

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Forestry

A GENERAL INTRODUCTION TO FORESTRY IN THE UNITED STATES—Nelson C. Brown—*Wiley*, 293 p., \$3.25. A teaching forester of much experience here offers a text that is adequate in its treatment of standard forestry subjects such as propagation, protection and use, and also offers information lacking in many other texts on new developments like the Civilian Conservation Corps and the soil conservation movement. There is a brief but well-selected bibliography.

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Phycology

THE ALGAE AND THEIR LIFE RELATIONS—Josephine E. Tilden—*Univ. of Minn. Press*, 550 p., \$5. General botanists, as well as the specializing phycologists for whom it is primarily intended, will find this book exceedingly useful. It does not confine itself simply to the taxonomy of the phylum but goes into questions of phylogeny, life cycles and especially ecology—in which man is concerned more intimately than he generally realizes. There are numerous well-executed line illustrations and a 22-page bibliography.

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Geography

JOURNEYS AROUND THE WORLD—Douglas C. Ridgley—*McKnight & McKnight*, 48 p., 20c. Although intended primarily for class use, this booklet is worth reading if you expect to treat yourself to a world cruise—or if you just do your travelling at home.

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Ornithology

CATALOGUE OF BIRDS OF THE AMERICAS, PART VIII—Charles E. Hellmayr—*Field Museum of Natural History*, 541 p., \$4. Lists species in families from Alaudidae to Comptophylidae.

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Folk-lore

FOLK-LORE FROM ADAMS COUNTY, ILLINOIS—Harry Middleton Hyatt—*Alma Egan Hyatt Foundation*, 723 p., \$6. Any one who does not think of the United States as rich in quaint folk beliefs and sayings will find this book amazing. Following a brief preface, the entire book consists of 10,949 "items" of folk lore gathered mostly in and around Quincy, Illinois. The items are classified, and there is an index.

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Additional Reviews
On Page 287

Medicine

LIVING ALONG WITH HEART DISEASE—Louis Levin—*Macmillan*, 126 p., \$1.50. A short, very readable book designed to allay the fear of heart disease in patients suffering from it and to build up understanding between the patient and his physician. Commonly asked questions about heart disease are answered clearly and the chief disorders of the heart and high blood pressure are explained.

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Botany

THE STORY OF THE PLANT KINGDOM—Merle C. Coulter—*Univ. of Chicago Press*, 270 p., \$2.50. The name Coulter means much in the history of modern American botany teaching; here we see a son well able to hold up the torch his father passed to him. Dr. Coulter's book is a new departure in teaching texts, as the Chicago course is a new departure in botanical teaching. It is refreshing to get hold of a freshman book with so few pages, yet with so much basic information in plant science, and withal so cleanly illustrated.

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Marriage

A MARRIAGE MANUAL, A PRACTICAL GUIDE-BOOK TO SEX AND MARRIAGE—Hannah M. and Abraham Stone—*Simon and Schuster*, 334 p., \$2.50. Here is a question and answer book about marriage, sex, contraception and related topics. A young couple about to be married ask the questions and the doctor answers them simply and fully.

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Invention

THE SOCIOLOGY OF INVENTION—S. C. Gilfillan—*Follett*, 185 p., \$2. A volume which links two fields of thought that rarely meet—engineering and social science. Said to be "the first work . . . on the sociologic and economic causes of technic invention." Using as an example an invention with which he is intimately familiar, the ship, Dr. Gilfillan arrives at 38 social principles of invention.

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Astronomy

A WORKING OUTLINE OF ENGINEERING ASTRONOMY—Jerry H. Service—*Edwards Bros.*, 169 p., \$2. This book tells how, with only a good transit and a good watch, a civil, geological or mining engineer can map accurately an

extended area (say 20 miles square). Plane coordinates avail nothing for such work, and yet the problem is widely encountered throughout the world, particularly in those regions where the greatest natural resources exist. Spherical trigonometry is assumed as background but a short review is given. Finally a few highlights of cosmology are given to arouse the engineering curiosity although not essential to the practical work presented.

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Mathematics

MATHEMATICS FOR EVERYDAY USE—John C. Stone and Virgil S. Mallory—*Benj. H. Sanborn*, 567 p., \$1.28. Starting with the thesis that intermediate high school mathematics is now primarily designed for the laudable but often unrealizable goal of meeting college requirements, the authors give rough and ready mathematics which one can use in all later life whether or not college lies ahead.

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Public Health

PUBLIC HEALTH ADMINISTRATION IN THE UNITED STATES—Wilson G. Smilie—*Macmillan*, 458 p., \$3.50. This book summarizes present information as to the most suitable methods of public health administration in the United States. Since it is the first time this information has been made readily available in a single volume, the book will undoubtedly be welcomed as a valuable reference aid by all public health workers. In the concluding chapter the author indicates briefly how health administration may develop in the future.

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Chemistry

ORGANIC SOLVENTS—Arnold Weissberger and Erich Proskauer—*Oxford*, 212 p., \$5. An English translation from an original German manuscript in this important field. Tables showing the physical constants of 157 important organic solvents are given. The literature of nonaqueous solutions is brought up to date and includes a bibliography of 1406 references.

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Astronomy

ECLIPSES OF THE SUN; Fourth Ed., Rev.—S. A. Mitchell—*Columbia Univ. Press*, 520 p., \$5. New chapters have been added, describing the eclipses of 1932 and 1934, and necessary revisions have been made elsewhere. This still remains by far the best book available on its special subject.

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Archaeology

EXCAVATIONS AT TEPE GAWRA—E. A. Speiser—*University of Penna. Press*, 200 p., 86 plates, \$6. An archaeological report on a Great Mound near the Tigris, which has been reduced over half its impressive height, thereby revealing many successive settlements. "No other site in Northern Mesopotamia has shed light on so long a series of prehistoric and early historic occupations," writes Dr. Speiser. The volume sums up three campaigns, describing architecture, pottery, burials, and small objects. Two later campaigns directed by Charles Bache, will be reported separately.

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Entomology

A CONTRIBUTION TO A BIBLIOGRAPHY OF THE DESCRIBED IMMATURE STAGES OF NORTH AMERICAN COLEOPTERA—J. S. Wade—*U. S. Dept. of Agr.*, 114 mimeographed leaves. Free on application to the U. S. Department of Agriculture, Washington, D. C.

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Geography

STUDIES IN ECONOMIC GEOGRAPHY—Douglas C. Ridgley and J. Sullivan Gibson—*McKnight & McKnight*, 128 p., 48c. A combination of brief text, sketch maps and workbook, for use in senior high school or junior college courses.

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General Science

DIRECTED ACTIVITIES: I. A WORK-BOOK TO GUIDE PUPILS IN THEIR STUDY OF THE WORLD AROUND US—Samuel R. Powers, Elsie F. Neuner, Herbert B. Bruner—*Ginn*, 113 p., 40c.

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